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one of its margins, a rod-like element projects. Its total length is about four feet, of which the acetabular sinus measures about 8.10 inches.

A short bone pertaining to the limbs has the articular surfaces at a strong angle to each other, hence the shaft is twisted. It is deeply grooved on one side near the extremity. The other extremity bears a rather flattened hour-glass shaped articular face, and below it on one angle is a crest. The convexity of the surface is not great, and this extremity resembles that of a Dinosaurian or Crocodilian reptile. Its length is, however, only eight and a quarter inches; apparently too small for a humerus, though this is not certain, while it is decidedly too small for a metatarsal of such an animal.

From the above description, it is evident that the animal of Black Buttes is a Dinosaurian reptile, the characters of the sacral and iliac bones alone sufficing to demonstrate this point. If the reader will compare the measurements given for species of this group already known, he will observe that those of the present animal exceed those yet described from North America. It is possible that if the corresponding parts of *Hadrosaurus tripos*, Cope, or *Thespesius occidentalis*, Leidy, are discovered, they may approach it.

It is thus conclusively proven that the coal strata of the Bitter Creek Basin of Wyoming Territory, which embraces the greater area yet discovered, were deposited during the Cretaceous period, and not during the Tertiary, though not long preceding the latter. It appears that the forests that intervened between the swamps of epochs, during which the coal was formed, were inhabited by these huge monsters. That one of them laid down to die near the shore of probably a brackish-water inlet, and was soon covered by the thickly fallen leaves of the wood. That continued subsidence of the level submerged the bones, which were then covered by sand.

The form of the ilium differs very materially from that of *Hadrosaurus*, and the vertebræ are plane, thus differing from *Thespesius*. The limb bone is distinct from anything in *Laelaps*, which, moreover, probably resembles *Thegalosaurus* in its ilium. The present form recalls rather *Cetiosaurus*. As it is evidently new to our system, it may be called  
AGATHAUMAS SYLVESTRIS.

## NOTICES OF NEW VERTEBRATA FROM THE UPPER WATERS OF BITTER CREEK, WYOMING TERRITORY.

BY EDWARD D. COPE.

(Read before the American Philosophical Society, September 19, 1872.)

SYNOPLOTHERIUM CANIUS. Cope. Gen. et sp. nov.

This genus possesses the dental formula so far as known,  $I. \frac{3}{1} c. \frac{1}{0} M. \frac{2}{0}$ . In the only specimen with molars, the crowns are much worn, but in all, the antero-posterior much exceeds the transverse diameter, and consisted

of two lobes. The posterior molar had no more lobes, and is smaller than the penultimate. The first is two-rooted, and is separated by a wide space from the inferior canine. The superior canine is of disproportionately large size, and issues a little behind the premaxillary suture. The incisions are crowded closely together, and are of conic form. The exterior is several times as large as the others. The inferior incisors are of huge size, project upwards after the manner of rodents, and are inserted by a short base into the solid symphysis. They are separated by a short interspace, which is without alveoli.

The fore foot possesses four digits, of which the inner is considerably the shorter. Phalanges not slender; ungueals flat, deeply fissured above. Caudal vertebrae slender.

This most remarkable genus is not at present referable to its proper order. The superior anterior teeth are of carnivorous type; the opposing teeth look like those of rodents, while the molar teeth differ from both. It is allied to *Anchippodus*, Leidy, which is only known from mandibles. This form Dr. Leidy has called the "gnawing hog," but, as it probably exhibits a structure similar to that seen in the present genus, it is obvious that the huge symphyseal teeth were not designed for gnawing in the usual sense. I suspect these animals to have lived largely on turtles,\* and that the structure in question was adapted for crushing their shells. This is the more likely from the prodigious number of turtles which must have existed contemporaneously with them. There are twenty species described from the Bridger formation, and their numbers are legion, as already described by Professor Marsh. Their bones are always in sight, and six or eight are not unfrequently found lying together.

*Char. specif.* The mandibular rami, posterior to the symphysis, are not heavily constructed. The symphyseal teeth are very stout, and exhibit two longitudinal grooves on the outer and outer inferior face; the shaft is compressed, and the worn surface is on the outer side, as produced by the canines, and on the extremity, produced by the outer incisor. The superior canine is compressed, and as large as that of a grizzly bear. The outer incisor is nearly straight, and with conic crown. A large part of its shaft is exposed at the bottom of a wide vertical groove, which extends upwards between the canine tooth and a ridge descending from the edge of the nares. The external narial opening is entirely anterior, and is narrowed below, in accordance with the narrowing of the premaxillaries.

M.

Length of interior dental series to bases of symphyseal	
tooth.....	0.170
Depth ramus at last molar.....	.050
Length symphysis.....	.060
“ muzzle from canine.....	.017
Length symphyseal tooth projected.....	.010
Diameter “ “ “ .....	.026
“ canine “ “ .....	.023

\* This view was already expressed in *The Friend*, Philada., 1872, Winter

If the body of this animal were of usual proportions as relates to the skull, it was about the size of the black bear (*Ursus americanus*). The worn condition of the teeth indicates an old animal, and one that had lived on hard food.

*EOBASILEUS CORNUTUS*. Cope.

Gen. et sp. nov.

Established on remains of five individuals of the average size of the *Mastodon ohioiticus*. These indicate clearly a form of proboscidian not before recognized. The structure of the tibia and astragalus, clearly indicate that the species is not artiodactyle, while the perfectly simple femur is not perissodactyle. The posterior part of the cranium, and the short stout phalanges are proboscidian. The existence of horns on the frontal bones separates it at once from *Dinotherium*, *Mastodon*, *Stegodon*, or *Elephas*, and indicates a remarkable combination of structure not before known to naturalists. The gigantic size of the typical species adds to its interest, and shows it to have been the monarch of the remarkable fauna disclosed by recent researches in Wyoming.

The distal extremities of both humerus and femur are flat, the former with oblique trochlear face and shallow olecranon fossa. The great trochanter of the femur is flat and not recurved; little trochanter wanting. Spine of tibia very obtuse; distal extremity little excavated. Distal extremity of phalanges not divided by trochlear ridge.

Articular extremities of vertebræ plane; the cervicals very short.

Cranium with vertical occiput with broad convex superior outline. Temporal fossæ lateral, posteriorly small. Horn-cores obtuse, compressed, most at base; direction divergent.

	NUMBER 1.	M.
Length of horn-cores (6 inches).....		0.152
Elevation occiput from foramen magnum.....		.180
Width across supra-occipital crest.....		.315
“ of condyles with foramen.....		.206
“ “ paramastoid process.....		.087

	NUMBER 2.	
Transverse diameter condyles humerus.....		.185

	NUMBER 3.	
Diameter extremity tibia (transverse).....		.126
“ “ “ (antero-posterior).....		.096
“ head “ (transverse).....		.140
“ glenoid cavity scapula.....		.150

Further details of the structure of this animal will be sought for with interest. From the manner of its occurrence, it probably went in families or herds.

*CROCODILUS CLAVIS*. Cope.

This is a large species with a muzzle of narrowed proportions and sufficient depth to give it a broad oval section. The nasal bones appear to have reached the narial orifice. The anterior superior teeth are very large, especially the canine. The inferior tooth corresponding is large,

and occupies an emargination which approaches near to the nasal suture. The pitting of the muzzle is fine, and the swollen interspaces much the wider. The teeth have stout conic crowns, with well-developed cutting edges and coarse striate sculpture. The mandible is acuminate to the narrow extremity, and has a long symphysis, which extends to opposite the third tooth behind the notch. The cervical vertebræ preserved, have round cups; they have a simple elongate hypapophysis with a pit behind it; shoulder very prominent.

	M.
Length of ramus with teeth.....	
“ “ symphysis.....	.135
Width do. at end of symphysis.....	.085
“ do. “ mandible.....	.020
“ maxillary at third tooth above.....	.060
“ “ “ notch above.....	.020

This species has a more slender muzzle than those described by Marsh and Leidy, and is of larger size.

#### RHINEASTES PELTATUS. Cope.

Gen. et sp. nov. Nematognathorum.

Established on cranial and other bones, with spines of a siluriform fish of the size of the largest species of *Amiurus*. The form, in the excessive rugosity of the external long surfaces, reminds one of some of the Brazilian *Dorades*. The frontal fontanelle is closed, though very distinctly marked by a groove of the surface not rugose. The rugosity consists of innumerable, packed osseous papillæ. The cranial ossification is continued posteriorly as a shield, which is strongly convex from side to side. The spine is symmetrical, and probably dorsal. It is compressed and curved antero-posteriorly, and is deeply grooved behind. Laterally it is closely striate grooved; the anterior face is narrowed, obtuse, and minutely serrate with cross ridges; each side of it is rugose with several irregular series of pronounced tubercles, arranged transversely.

	M.
Width frontal bone near front of fontanelle.....	0.012
Thickness at do. ....	.004
“ “ of casque.....	.004
Width spine.....	.005
Depth “ .....	.009

#### RHINEASTES SMITHII. Cope.

Indicated by a dorsal spine of an individual of smaller size than the type of the last named. It is less rugose, and more firmly striate, and possesses a row of short reverted spines in its posterior groove. The anterior edge is furnished with a finely serrate keel, which has a groove on each side at the base. The section is oval, the posterior face not being flattened as in the last species. Antero-posterior diameter near middle M. .005; at base .006; width behind above base .006.

Named for my respected friend, Daniel B. Smith, of Germantown; many years Principal of Haverford College, and a student and lover of the Natural Sciences.